

Interim Environmental Monitoring Report for the
Nevada Test Site, First Quarter 1981

(U.S.) Environmental Monitoring Systems Lab.
Las Vegas, NV

Prepared for

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by

Nuclear Radiation Assessment Division
Environmental Monitoring Systems Laboratory
Las Vegas, Nevada 89114

prepared for the
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under Interagency Agreement
No. DE-AI08-76DP00539

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
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INTERIM ENVIRONMENTAL MONITORING REPORT
FOR THE NEVADA TEST SITE
First Quarter 1981

SUMMARY

During the first calendar quarter of 1981, no radioactivity from the nuclear tests conducted at the Nevada Test Site was measured offsite by the U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory.

Low concentrations of ^{95}Zr , ^{95}Nb , ^{103}Ru , and ^{141}Ce attributed to the People's Republic of China nuclear test of October 15, 1980, were detected in air samples throughout the Air Surveillance Network. The maximum concentrations of these radionuclides were less than 0.1 percent of the Concentration Guides.

The dosimeters of a fixed station at Complex I (Coal Valley) indicated an exposure of 1.6 mR, and the dosimeters of two offsite residents, one living at Glendale, Nev., and the other near Complex I, (Coal Valley) appeared to have net exposures of 3.1 mR and 3.2 mR, respectively; however, further evaluation revealed that the net exposures were not due to an exposure from NTS operations, but may be a statistical anomaly related to an unusually low variation in the environmental background exposure rate. Further investigation is in progress.

INTRODUCTION

Under a Memorandum of Understanding with the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency conducts an Offsite Radiological Surveillance and Safety Program in support of nuclear testing at the Nevada Test Site (NTS). Under this Program, samples of air, milk, and water are regularly collected and analyzed for radioactivity, and ambient environmental gamma radiation levels are monitored by a dosimetry network. These data are used to document changes in levels of radioactivity and to assess radiation exposures to off-NTS residents. All data from the surveillance program are reported in an annual environmental monitoring report.

The following sections present the analytical results for samples collected from the air, milk, and dosimetry networks for the first calendar quarter of 1981. For maps showing sampling locations and for a detailed explanation of the operational and analytical procedures, the reader is referred to the annual environmental monitoring reports for 1979 or 1980.

AIR SURVEILLANCE NETWORK

During the first quarter of 1981, the Air Surveillance Network (ASN) consisted of 24 continuously operating sampling stations and 97 standby stations in 21 western states. Throughout the network concentrations of ^7Be , ^{95}Zr , ^{95}Nb , ^{103}Ru , and ^{141}Ce were detected. The principal means of ^7Be

production is from spallation of ^{16}O and ^{14}N in the atmosphere by cosmic-rays. The remainder of the radionuclides detected are fission products attributed to the atmospheric nuclear test conducted by the People's Republic of China on October 15, 1980, at 2130 PDT.

Table 1 lists the maximum, minimum, and average concentration in air for each of the above fission products along with the total number of days it was detected at each sampling location. The average concentration values for the individual radionuclides that were detected were averaged over the total operating time of each station assuming that the individual concentration values less than the MDC (0.02 pCi/m^3) were equal to zero.

The locations at which the maximum concentration of each fission product was detected are as follows:

Location	Radionuclide	Half-Life	Maximum Concentration (pCi/m^3)	%CG*
Death Valley Jct, Calif.	^{95}Zr	65.5d	0.89	0.027
Hiko & Tonopah, Nev.	^{95}Nb	35.1d	0.59	0.059
Glendale, Nev.	^{103}Ru	39.6d	0.42	0.042
Stone Cabin Ranch, Nev.	^{141}Ce	32.4d	0.12	0.0072

*Percent of the Concentration Guides (CG's) for a suitable sample of the exposed population were determined assuming that the maximum concentration persisted for a full year.

Although the CG's of the DOE, as specified in the DOE Manual, Chapter 0524, are not applicable to foreign atmospheric nuclear tests, the percentages of the relevant CG's are shown as a means of interpreting the potential radiological hazard from the observed radionuclide concentrations.

NOBLE GAS AND TRITIUM SURVEILLANCE NETWORK

The Noble Gas and Tritium Surveillance Network consists of special air samplers located at six onsite and six offsite locations. The analytical results for samples collected at these locations are summarized in Table 2, which lists the maximum, minimum, and average concentrations in air for ^{85}Kr , radon, and tritium. The average concentration at each station was calculated over the time period sampled using all values, including those less than the minimum detectable concentration.

The average ^{85}Kr concentrations during this report period for all sampling locations ranged between 21 and 26 pCi/m^3 with an overall network average of 23 pCi/m^3 . These data indicate a continuation of the gradually increasing trend in ambient concentrations that has been observed since sampling began in 1972. This increase, observed at all stations, probably

reflects the worldwide increase in ^{85}Kr levels resulting from the proliferation of nuclear technology.

The station showing the highest average and maximum concentrations of ^{85}Kr during the reporting period occurred at an onsite station (BJY) with 26 pCi/m³ and 37 pCi/m³, respectively. The concentration averages of ^{85}Kr at this station have often been higher than the averages at all other stations in the past and are no doubt due to the seepage of noble gas from past underground nuclear detonations.

Radioxenon was not detected at any station during the reporting period.

As shown in Table 2, the average concentrations of tritium in atmospheric moisture were less than 0.5 pCi/ml for all offsite stations and the onsite stations of Area 400, Mercury, and Area 51. For the onsite stations at Area 15, BJY, and Area 12, the concentrations of tritium in atmospheric moisture were usually higher, ranging up to 23 pCi/ml at the Area 15 station. The substantial difference between tritium concentrations at offsite and onsite stations has been observed frequently in the past. As expected, the average concentrations of tritium in air correlated with the tritium in atmospheric moisture.

MILK SURVEILLANCE NETWORK

During the first quarter 1981, milk samples were collected from 16 of the 24 stations that constituted the network around the Nevada Test Site. At the remaining 8 stations, the cows were not lactating or had been sold.

Table 3 lists the routine sampling locations with the analytical results of those samples that were collected. No gamma-emitting radionuclides related to weapons testing were detected in any of the samples.

The concentrations of tritium and strontium in the milk samples were not above levels observed in the past. However, the strontium-90 concentrations in the milk samples collected at Young's Ranch, McKenzie Dairy, Agman Seventy-Five, Inc., Sharp's Ranch, June Cox Ranch, and Cotton Dairy appeared to be too low as were the quality assurance cross-check samples. When an investigation into the cause of these low results is completed, the ^{90}Sr results of Table 3 will probably be revised.

DOSIMETRY NETWORK

Seventy-nine locations surrounding the NTS are monitored continuously with thermoluminescent dosimeters (TLD's) that are exchanged on a quarterly basis. In addition, 25 offsite residents each voluntarily wear a dosimeter, which is exchanged at the same time as the station dosimeters.

During this report period, no exposures attributable to current nuclear testing at the NTS were detected by the dosimeters at fixed stations. Table 4 lists the exposure rate determined for each station with the average environmental background exposure rate estimated for each location over the four previous quarterly periods during which no net exposure occurred. The station exposure rates at each location were considered to be background, i.e. the station average exposure rate did not exceed the environmental background exposure rate plus three standard deviations.

The dosimeters from one fixed station and two of the cooperating offsite residents indicated exposures in excess of the background exposure rate estimated for their area; however, these exposures were attributed to the very low variation in the environmental background for these locations and not to a true exposure. If an average of the standard deviations in the environmental backgrounds for the whole network is used in the determination of a net exposure, the mean exposure rates for the fixed station and the two individuals are not significantly different at the 99% significance level from the environmental background exposure rates for each location.

LONG-TERM HYDROLOGICAL MONITORING NETWORK

During this report period, water samples were collected around the Nevada Test Site and at the sites of Projects Shoal, Gasbuggy, Gnome, and Dribble. Table 5 lists the results of the tritium analyses by the conventional method only for those samples that were completed in time for this report, namely those for the NTS monthly sampling, the NTS semi-annual sampling, and Project Dribble.

All samples with an indicated tritium concentration less than 700 pCi/l will be submitted for tritium enrichment analysis.

The tritium concentrations in all samples appeared to be consistent with past results. The highest concentration of tritium at the NTS, 2300 pCi/l, was from Well UE7NS, which has shown higher than background levels of tritium ever since pump tests were conducted at the well. The tritium concentrations above 700 pCi/l in samples collected at the Project Dribble site are attributed to sub-surface tritium contamination left by post-shot, clean-up operations.

No gamma-emitting radionuclides were detected in any of the samples by high resolution gamma spectrometry.

TABLE 1. SUMMARY OF AIR SURVEILLANCE NETWORK RESULTS
FIRST QUARTER 1981

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)		
			C _{max}	C _{min}	C _{avg}
Death Valley Jct., Calif.	20.0	⁷ Be	0.39	0.14	0.052
	70.0	⁹⁵ Nb	0.36	0.035	0.12
	53.0	⁹⁵ Zr	0.89	0.046	0.084
	65.0	¹⁰³ Ru	0.12	0.029	0.043
	42.0	¹⁴¹ Ce	0.09	0.027	0.023
Furnace Creek, Calif.	14.5	⁷ Be	0.34	0.18	0.043
	54.9	⁹⁵ Nb	0.26	0.060	0.091
	48.9	⁹⁵ Zr	0.17	0.030	0.054
	46.1	¹⁰³ Ru	0.10	0.026	0.034
	31.1	¹⁴¹ Ce	0.060	0.033	0.018
Shoshone, Calif.	2.0	⁷ Be	0.27	0.27	0.0060
	66.9	⁹⁵ Nb	0.29	0.040	0.10
	34.9	⁹⁵ Zr	0.16	0.064	0.040
	49.9	¹⁰³ Ru	0.11	0.019	0.032
	35.9	¹⁴¹ Ce	<0.84	0.029	0.019
Alamo, Nev.	6.0	⁷ Be	0.29	0.24	0.021
	54.3	⁹⁵ Nb	0.34	0.053	0.11
	33.2	⁹⁵ Zr	0.26	0.054	0.060
	48.6	¹⁰³ Ru	0.11	0.026	0.038
	31.1	¹⁴¹ Ce	0.061	0.026	0.018
Beatty, Nev.	16.0	⁷ Be	0.38	0.19	0.05
	56.8	⁹⁵ Nb	0.40	0.048	0.10
	42.8	⁹⁵ Zr	0.23	0.076	0.061
	50.8	¹⁰³ Ru	0.14	0.031	0.043
	36.8	¹⁴¹ Ce	0.099	0.029	0.026
Stone Cabin Ranch, Nev.	2.0	⁷ Be	0.75	0.75	0.018
	62.3	⁹⁵ Nb	0.44	0.068	0.18
	40.6	⁹⁵ Zr	0.39	0.061	0.082
	61.2	¹⁰³ Ru	0.17	0.028	0.062
	31.7	¹⁴¹ Ce	0.12	0.039	0.028
Currant, Nev. Blue Eagle Ranch	5.9	⁷ Be	0.47	0.21	0.023
	56.0	⁹⁵ Nb	0.44	0.041	0.12
	40.1	⁹⁵ Zr	0.31	0.066	0.059
	55.9	¹⁰³ Ru	0.16	0.036	0.046
	26.0	¹⁴¹ Ce	0.10	0.028	0.016

(continued)

TABLE 1. (Continued)

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)		
			C _{max}	C _{min}	C _{avg}
Glendale, Nev.	7.0	⁷ Be	0.34	0.17	0.021
	57.6	⁹⁵ Nb	0.45	0.041	0.11
	26.1	⁹⁵ Zr	0.24	0.053	0.040
	35.7	¹⁰³ Ru	0.42	0.035	0.042
	23.7	¹⁴¹ Ce	0.062	0.035	0.013
Goldfield, Nev.	8.0	⁷ Be	0.37	0.25	0.027
	70.9	⁹⁵ Nb	0.35	0.065	0.15
	41.9	⁹⁵ Zr	0.20	0.063	0.064
	52.9	¹⁰³ Ru	0.14	0.041	0.047
	33.0	¹⁴¹ Ce	0.085	0.044	0.025
NTS, Nev. - Area 51	2.8	⁷ Be	0.26	0.26	0.011
	48.8	⁹⁵ Nb	0.36	0.057	0.13
	24.0	⁹⁵ Zr	0.27	0.083	0.052
	46.0	¹⁰³ Ru	0.12	0.032	0.048
	19.0	¹⁴¹ Ce	0.072	0.032	0.016
Hiko, Nev.	10.0	⁷ Be	0.37	0.20	0.032
	56.9	⁹⁵ Nb	0.59	0.035	0.089
	27.0	⁹⁵ Zr	0.71	0.065	0.052
	49.8	¹⁰³ Ru	0.14	0.032	0.032
	18.9	¹⁴¹ Ce	0.075	0.032	0.01
Indian Springs, Nev.	7.0	⁷ Be	0.46	0.23	0.026
	54.8	⁹⁵ Nb	0.41	0.022	0.081
	34.0	⁹⁵ Zr	0.25	0.057	0.040
	37.0	¹⁰³ Ru	0.17	0.020	0.021
	24.0	¹⁴¹ Ce	0.091	0.027	0.013
Las Vegas, Nev.	16.0	⁷ Be	0.56	0.14	0.050
	59.7	⁹⁵ Nb	0.44	0.043	0.12
	45.4	⁹⁵ Zr	0.27	0.045	0.062
	50.9	¹⁰³ Ru	0.13	0.022	0.043
	36.8	¹⁴¹ Ce	0.072	0.024	0.023
Lathrop Wells, Nev.	7.8	⁷ Be	0.28	0.26	0.023
	67.1	⁹⁵ Nb	0.44	0.041	0.11
	45.2	⁹⁵ Zr	0.26	0.048	0.049
	57.6	¹⁰³ Ru	0.13	0.018	0.034
	38.4	¹⁴¹ Ce	0.077	0.031	0.022

(continued)

TABLE 1. (Continued)

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)		
			C _{max}	C _{min}	C _{avg}
Nyala, Nev.	15.0	⁷ Be	0.42	0.23	0.050
	58.0	⁹⁵ Nb	0.50	0.078	0.15
	42.0	⁹⁵ Zr	0.27	0.052	0.072
	51.0	¹⁰³ Ru	0.11	0.043	0.046
	31.0	¹⁴¹ Ce	0.090	0.034	0.019
Pahrump, Nev.	6.9	⁷ Be	0.54	0.30	0.028
	70.0	⁹⁵ Nb	0.37	0.029	0.11
	49.0	⁹⁵ Zr	0.21	0.054	0.055
	66.0	¹⁰³ Ru	0.12	0.026	0.045
	42.0	¹⁴¹ Ce	0.093	0.025	0.026
Scotty's Jct., Nev.	9.0	⁷ Be	0.28	0.26	0.027
	69.6	⁹⁵ Nb	0.25	0.045	0.10
	31.6	⁹⁵ Zr	0.19	0.044	0.042
	60.6	¹⁰³ Ru	0.098	0.032	0.041
	35.0	¹⁴¹ Ce	0.072	0.030	0.018
Sunnyside, Nev.	2.9	⁷ Be	0.26	0.26	0.0090
	70.8	⁹⁵ Nb	0.44	0.078	0.17
	38.1	⁹⁵ Zr	0.30	0.087	0.067
	67.4	¹⁰³ Ru	0.17	0.041	0.069
	46.1	¹⁴¹ Ce	0.10	0.040	0.035
Rachel, Nev. Robinson Trailer Park	2.0	⁷ Be	0.43	0.43	0.011
	53.0	⁹⁵ Nb	0.41	0.046	0.098
	32.1	⁹⁵ Zr	0.31	0.065	0.045
	56.0	¹⁰³ Ru	0.12	0.025	0.042
	42.0	¹⁴¹ Ce	0.070	0.027	0.025
Tonopah, Nev.	13.0	⁷ Be	0.60	0.19	0.054
	58.0	⁹⁵ Nb	0.59	0.058	0.13
	49.1	⁹⁵ Zr	0.26	0.075	0.074
	56.0	¹⁰³ Ru	0.12	0.034	0.050
	30.1	¹⁴¹ Ce	0.12	0.041	0.022
TTR, Nev.	27.4	⁷ Be	0.41	0.21	0.12
	60.9	⁹⁵ Nb	0.39	0.090	0.18
	45.8	⁹⁵ Zr	0.25	0.082	0.092
	58.9	¹⁰³ Ru	0.12	0.042	0.071
	51.1	¹⁴¹ Ce	0.084	0.033	0.038

(continued)

TABLE 1. (Continued)

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)		
			C _{max}	C _{min}	C _{avg}
Delta, Utah	3.0	⁷ Be	0.17	0.17	0.0059
	73.9	⁹⁵ Nb	0.27	0.040	0.12
	23.6	⁹⁵ Zr	0.27	0.068	0.033
	52.1	¹⁰³ Ru	0.080	0.027	0.032
	14.2	¹⁴¹ Ce	0.086	0.051	0.0097
Milford, Utah	6.0	⁷ Be	0.41	0.20	0.026
	47.9	⁹⁵ Nb	0.38	0.11	0.15
	26.9	⁹⁵ Zr	0.22	0.092	0.056
	40.9	¹⁰³ Ru	0.13	0.041	0.048
	24.9	¹⁴¹ Ce	0.078	0.024	0.019
St. George, Utah	3.0	⁷ Be	0.23	0.23	0.0076
	79.6	⁹⁵ Nb	0.35	0.037	0.12
	41.0	⁹⁵ Zr	0.21	0.063	0.053
	55.9	¹⁰³ Ru	0.11	0.030	0.036
	33.0	¹⁴¹ Ce	0.070	0.035	0.017

TABLE 2. SUMMARY OF NOBLE GAS AND TRITIUM SURVEILLANCE NETWORK RESULTS
FIRST QUARTER 1981

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)*			% of Conc. Guide**
			C _{max}	C _{min}	C _{avg}	
Beatty, Nev.	96.9	⁸⁵ Kr	30	18	24	0.02
	96.9	¹³³ Xe	<40	<7	<7	<0.01
	97.0	³ H in atm. m.	0.60	<0.5	<0.5*	
	97.0	³ H as HTO in air	<6	<2	<2	<0.01
Hiko, Nev.	95.6	⁸⁵ Kr	29	16	23	0.02
	95.6	¹³³ Xe	<30	<10	<10	<0.01
	96.0	³ H in atm. m.	1.0	<0.5	<0.5*	
	96.0	³ H as HTO in air	3.9	<0.7	1.3	<0.01
Indian Springs, Nev.	89.9	⁸⁵ Kr	31	18	23	0.02
	89.9	¹³³ Xe	<30	<10	<10	<0.01
	89.9	³ H in atm. m.	0.93	<0.5	<0.5*	
	89.9	³ H as HTO in air	<3	<0.8	0.97	<0.01
Lathrop Wells, Nev.	96.2	⁸⁵ Kr	30	16	22	0.02
	96.2	¹³³ Xe	<40	<8	<8	<0.01
	97.0	³ H in atm. m.	0.83	<0.5	<0.5*	
	97.0	³ H as HTO in air	<4	<2	<2	<0.01
NTS, Nev. - Area 15	89.9	⁸⁵ Kr	32	18	24	<0.01
	89.9	¹³³ Xe	<60	<10	<10	<0.01
	89.9	³ H in atm. m.	23	3.1	10*	
	89.9	³ H as HTO in air	90	15	42	<0.01
NTS, Nev. - Area 400	89.9	⁸⁵ Kr	29	15	22	<0.01
	89.9	¹³³ Xe	<70	8	<8	<0.01
	88.9	³ H in atm. m.	0.60	<0.5	0.5*	
	88.9	³ H as HTO in air	<4	<2	1.4	<0.01
NTS, Nev. - Mercury	89.9	⁸⁵ Kr	30	16	24	<0.01
	89.9	¹³³ Xe	<30	<10	<10	<0.01
	89.9	³ H in atm. m.	0.64	<0.5	<0.5*	
	89.9	³ H as HTO in air	4.0	<2	2.2	<0.01
NTS, Nev. - Area 51	89.9	⁸⁵ Kr	29	18	22	<0.01
	89.9	¹³³ Xe	<70	<20	<20	<0.01
	89.9	³ H in atm. m.	0.67	<0.5	<0.5*	
	89.9	³ H as HTO in air	3.6	0.63	1.4	<0.01
NTS, Nev. - BJY	90.0	⁸⁵ Kr	37	19	26	<0.01
	90.0	¹³³ Xe	<40	<4	<4	<0.01
	90.0	³ H in atm. m.	4.2	0.86	2.5*	
	90.0	³ H as HTO in air	12	1.7	6.9	<0.01

(continued)

TABLE 2. (Continued)

Location Sampling	No. Days Detected	Radio- nuclide	Radioactivity Conc. (pCi/m ³)*			% of Conc. Guide**
			C _{max}	C _{min}	C _{avg}	
NTS, Nev. - Area 12	89.9	⁸⁵ Kr	29	15	21	<0.01
	89.9	¹³³ Xe	<40	<6	<5.7	<0.01
	* 89.8	³ H in atm. m.	15	<1.8	<8.0*	
	89.8	³ H as HTO in air	51	2.6	22	<0.01
Rachel, Nev.	87.2	⁸⁵ Kr	33	13	4	0.02
	87.2	¹³³ Xe	<80	<20	<20	<0.01
	96.0	³ H in atm. m.	0.81	<0.5	<0.5*	
	96.0	³ H as HTO in air	3.5	<2	1.5	<0.01
Tonopah, Nev.	97.0	⁸⁵ Kr	27	18	21	0.02
	97.0	¹³³ Xe	<50	<10	<10	<0.01
	97.0	³ H in atm. m.	0.81	<0.5	<0.5*	
	97.0	³ H as HTO in air	3.9	<2	<2	<0.01

* Concentrations of tritium in atmospheric moisture (atm. m.) are expressed as pCi per ml of water collected.

** Concentration Guides used for NTS stations are those applicable to radiation workers. Those used for Off-NTS stations are for exposure to a suitable sample of the population in an uncontrolled area.

TABLE 3. MILK SURVEILLANCE NETWORK RESULTS FOR THE FIRST QUARTER 1981

Sampling Location	Collection Date	Radionuclide	Radioactivity Concentration (pCi/l $\pm$ 20)
Hinkley, Calif., Bill Nelson Dairy	02/02/81	^{89}Sr ^{90}Sr	<6 3.2 $\pm$ 0.8
Keough Hot Springs, Calif., Yribarren Ranch	01/22/81	^{89}Sr ^{90}Sr	<3 <2
Trona, Calif.	Not sampled		
Alamo, Nev., Buck Horn Ranch	01/14/81	^{89}Sr ^{90}Sr	<3 1.2 $\pm$ 0.4
Austin, Nev., Young's Ranch	01/07/81	^3H ^{89}Sr ^{90}Sr	<500 <2 <1
Caliente, Nev.	Not sampled	..	
Currant, Nev., Blue Eagle Ranch	01/13/81	^{89}Sr ^{90}Sr	NA* NA*
Currant, Nev., Manzonie Ranch	Not sampled		
Hiko, Nev., Darrel Hansen Ranch	01/13/81	^3H ^{89}Sr ^{90}Sr	450 $\pm$ 250 <20 4.2 $\pm$ 1.4
Las Vegas, Nev., LDS Dairy Farms	01/09/81	^3H ^{89}Sr ^{90}Sr	<500 <5 1.9 $\pm$ 0.7
Lathrop Wells, Nev., R. J. Eastman Ranch	01/07/81	^{89}Sr ^{90}Sr	NA** NA**
Lida, Nev., Lida Livestock Co.	Not sampled		
Lund, Nev., McKenzie Dairy	01/09/81	^3H ^{89}Sr ^{90}Sr	<500 <3 <1
Mesquite, Nev., Hughes Bros. Dairy	01/06/81	^3H ^{89}Sr ^{90}Sr	<500 <5 <2

(continued)

TABLE 3. (Continued)

Sampling Location	Collection Date	Radionuclide	Radioactivity Concentration (pCi/l $\pm$ 20)
Moapa, Nev., Agman Seventy-Five, Inc.	01/06/81	⁸⁹ Sr ⁹⁰ Sr	<3 0.88 $\pm$ 0.20
Nyala, Nev., Sharp's Ranch	01/07/81	³ H ⁸⁹ Sr ⁹⁰ Sr	<400 <1 <1
Overton, Nev., Robinson's Dairy	01/06/81	⁸⁹ Sr ⁹⁰ Sr	<9 <4
Caliente, Nev., June Cox Ranch	01/13/81	⁸⁹ Sr ⁹⁰ Sr	<2 0.71 $\pm$ 0.21
Pahrump, Nev., Oxborrow Ranch	Not sampled		
Round Mountain, Nev., Berg Ranch	Not sampled		
Shoshone, Nev., Kirkeby Ranch	Not sampled		
Springdale, Nev., Boiling Pot Ranch	Not sampled		
Cedar City, Utah, Western Gen. Dairies	01/07/81	⁸⁹ Sr ⁹⁰ Sr	<4 <2
St. George, Utah, Cottam Dairy	01/07/81	⁸⁹ Sr ⁹⁰ Sr	<1 0.30 $\pm$ 0.09

* No analysis due to sour milk.

** Not Analyzed (NA) at the present time. Sampling location replaces Kirker Ranch.

TABLE 4. DOSIMETRY NETWORK EXPOSURES FOR THE FIRST QUARTER 1981

Station Name	Period of Measurement		Rep. ¹ Avg. (mR)	Avg. ² Exp. (mR/d)	Env. ³ Bkg. (mR/d)	Std. ⁴ Dev.	Net ⁵ Exp. (mR)
	Issue	Collect					
Adaven, Nev.	01/13/81	04/02/81	28	0.35	0.37	0.011	0.0
Alamo, Nev.	01/14/81	04/06/81	18	0.22	0.23	0.0050	0.0
Area 51-NTS, Nev.	01/06/81	04/06/81	16	0.18	0.19	0.0079	0.0
Austin, Nev.	01/07/81	04/01/81	24	0.28	0.29	0.015	0.0
Baker, Calif.	01/20/81	03/31/81	16	0.23	0.23	0.014	0.0
Barstow, Calif.	01/20/81	03/31/81	21	0.30	0.31	0.0043	0.0
Beatty, Nev.	01/07/81	04/07/81	24	0.27	0.27	0.010	0.0
Bishop, Calif.	01/22/81	04/02/81	18	0.25	0.27	0.0050	0.0
Blue Eagle Ranch, Nev.	01/13/81	04/01/81	14	0.18	0.17	0.0060	0.0
Blue Jay, Nev.	01/08/81	04/07/81	30	0.33	0.34	0.011	0.0
Cactus Springs, Nev.	01/06/81	04/06/81	14	0.16	0.17	0.011	0.0
Caliente, Nev.	01/13/81	04/08/81	25	0.30	0.32	0.0092	0.0
Carp, Nev.	01/16/81	04/08/81	25	0.30	0.30	0.0090	0.0
Casey's Ranch, Nev.	01/07/81	04/07/81	19	0.22	0.22	0.014	0.0
Cedar City, Utah	01/07/81	04/01/81	17	0.21	0.21	0.0080	0.0
Clark Station, Nev.	01/08/81	04/06/81	29	0.32	0.33	0.0066	0.0
Complex I, Nev.	01/13/81	04/02/81	24	0.30	0.28	0.0017	1.6
Coyote Summit, Nev.	01/06/81	04/06/81	30	0.33	0.36	0.022	0.0
Currant, Nev.	01/13/81	04/01/81	22	0.29	0.28	0.0070	0.0
Death Valley Jct. Calif.	01/22/81	04/02/81	15	0.21	0.22	0.010	0.0
Desert Game Range, Nev.	01/06/81	04/06/81	13	0.14	0.16	0.0070	0.0
Diablo Maint. Sta. Nev.	01/07/81	04/06/81	33	0.37	0.39	0.042	0.0
Duckwater, Nev.	01/13/81	04/01/81	22	0.29	0.28	0.010	0.0
Elgin, Nev.	01/16/81	04/08/81	26	0.32	0.35	0.017	0.0
Ely, Nev.	01/08/81	03/31/81	18	0.22	0.21	0.0043	0.0
Enterprise, Utah	01/07/81	04/01/81	24	0.28	0.27	0.0092	0.0
Eureka, Nev.	01/07/81	04/01/81	25	0.30	0.29	0.024	0.0
Furnace Creek, Calif.	01/22/81	04/02/81	12	0.17	0.18	0.0067	0.0
Garrison, Utah	01/08/81	03/31/81	16	0.20	0.18	0.0040	0.0
Geyser Maint. Sta., Nev.	01/08/81	03/31/81	25	0.30	0.28	0.0064	0.0
Glendale, Nev.	01/06/81	03/31/81	14	0.17	0.16	0.0010	0.0
Goldfield, Nev.	01/06/81	03/31/81	21	0.25	0.26	0.0062	0.0
Hancock Summit, Nev.	01/06/81	04/06/81	36	0.40	0.40	0.016	0.0
Hiko, Nev.	01/14/81	04/06/81	18	0.22	0.21	0.0082	0.0
Hot Creek Ranch, Nev.	01/08/81	04/07/81	23	0.26	0.28	0.022	0.0
Independence, Calif.	01/21/81	04/01/81	18	0.26	0.28	0.0067	0.0
Indian Springs, Nev.	01/06/81	04/06/81	16	0.18	0.16	0.0059	0.0
Kirkeby Ranch, Nev.	01/08/81	03/31/81	18	0.22	0.21	0.0058	0.0
Koynes, Nev.	01/07/81	04/06/81	23	0.26	0.28	0.030	0.0
Las Vegas, (USDI) Nev.	01/07/81	03/31/81	14	0.16	0.17	0.0031	0.0
Las Vegas, Nev. (Airport)	01/07/81	03/31/81	12	0.14	0.14	0.0083	0.0
Las Vegas, Nev. (Placak)	01/07/81	03/31/81	12	0.14	0.14	0.0031	0.0

(continued)

TABLE 4. (Continued)

Station Name	Period of Measurement Issue Collect	Rep. ¹ Avg. (mR)	Avg. ² Exp. (mR/d)	Env. ³ Bkg. (mR/d)	Std. ⁴ Dev.	Net ⁵ Exp. (mR)
Lathrop Wells, Nev.	01/06/81 04/06/81	25	0.28	0.27	0.0073	0.0
Lavada's Market, Nev.	01/07/81 04/06/81	23	0.25	0.25	0.011	0.0
Lida, Nev.	01/06/81 03/31/81	23	0.27	0.27	0.011	0.0
Lone Pine, Calif.	01/21/81 04/01/81	19	0.27	0.28	0.0087	0.0
Lund, Nev.	01/09/81 04/01/81	20	0.24	0.23	0.0050	0.0
Mammoth Mtn. Calif.	01/22/81 04/01/81	16	0.23	0.28	0.0082	0.0
Manhattan, Nev.	01/07/81 04/01/81	28	0.33	0.34	0.030	0.0
Mesquite, Nev.	01/06/81 03/31/81	16	0.19	0.18	0.0078	0.0
Nevada Farms, Nev.	01/06/81 04/06/81	30	0.34	0.34	0.0092	0.0
Nuclear Eng. Co., Nev.	01/07/81 04/07/81	29	0.32	0.32	0.018	0.0
Nyala, Nev.	01/07/81 04/07/81	20	0.22	0.23	0.012	0.0
Olancho, Calif.	01/21/81 04/01/81	17	0.24	0.26	0.0028	0.0
Pahrump, Nev.	01/08/81 04/08/81	16	0.18	0.18	0.0046	0.0
Pine Creek Ranch, Nev.	01/13/81 04/02/81	26	0.33	0.35	0.025	0.0
Pioche, Nev.	01/13/81 04/07/81	20	0.23	0.24	0.0070	0.0
Queen City Summit, Nev.	01/06/81 04/06/81	33	0.37	0.37	0.016	0.0
Rachel, Nev.	01/06/81 04/06/81	28	0.31	0.30	0.019	0.0
Reed Ranch, Nev.	01/06/81 04/06/81	32	0.36	0.35	0.036	0.0
Ridgecrest, Calif.	01/20/81 03/31/81	17	0.24	0.24	0.0074	0.0
Round Mountain, Nev.	01/07/81 04/01/81	25	0.30	0.31	0.011	0.0
Rox, Nev.	Vandalized					
Scotty's Jct., Nev.	01/06/81 03/31/81	22	0.27	0.27	0.013	0.0
Sherri's Ranch, Nev.	01/13/81 04/06/81	17	0.20	0.21	0.0085	0.0
Shoshone, Calif.	01/22/81 04/02/81	20	0.28	0.30	0.010	0.0
Springdale, Nev.	01/08/81 04/07/81	27	0.30	0.31	0.020	0.0
Spring Meadows, Nev.	01/06/81 04/06/81	16	0.18	0.17	0.0065	0.0
St. George, Utah	01/07/81 04/02/81	15	0.18	0.18	0.0026	0.0
Stone Cabin Ranch, Nev.	01/08/81 04/07/81	28	0.31	0.31	0.019	0.0
Sunnyside, Nev.	01/09/81 04/02/81	16	0.19	0.18	0.0076	0.0
Tempiute, Nev.	01/07/81 04/06/81	29	0.32	0.33	0.011	0.0
Tenneco, Nev.	01/06/81 04/06/81	24	0.27	0.26	0.0079	0.0
Tonopah, Nev.	01/06/81 03/31/81	24	0.29	0.30	0.012	0.0
Tonopah Test Range, Nev.	01/07/81 03/31/81	23	0.27	0.27	0.0063	0.0
Twin Springs Ranch, Nev.	01/08/81 04/07/81	27	0.31	0.31	0.018	0.0
Valley Crest, Calif.	01/22/81 04/02/81	11	0.15	0.16	0.0050	0.0
Warm Springs, Nev.	01/07/81 04/06/81	28	0.31	0.32	0.015	0.0
Young's Ranch, Nev.	01/07/81 04/01/81	21	0.25	0.26	0.0066	0.0

¹ Replicate Average Total Exposure² Average Exposure Rate³ Environmental Background Exposure Rate⁴ Standard Deviation of Environmental Background Exposure Rate⁵ Net Exposures

TABLE 5. DOSIMETRY NETWORK EXPOSURES FOR NTS OFFSITE RESIDENTS
FIRST QUARTER 1981

Resident Number	Background Station Location	Period of Measurement		Rep. Avg. (mR)	Avg. Exp. (mR/d)	Net Exp. (mR)
		Issue	Collect			
1	Tonopah, Nev.	01/06/81	03/31/81	19	0.23	0.0
2	Caliente, Nev.	01/13/81	04/07/81	21	0.24	0.0
3	Blue Jay, Nev.	01/08/81	04/07/81	27	0.30	0.0
4	Glendale, Nev.	01/06/81	03/31/81	16	0.20	3.1 ¹
5	Lathrop Wells, Nev.	01/07/81	04/06/81	24	0.26	0.0
6	Indian Springs, Nev.	01/06/81	04/06/81	13	0.14	0.0
7	Goldfield, Nev.	01/06/81	03/31/81	18	0.22	0.0
8	Twin Springs Ranch, Nev.	01/08/81	04/07/81	24	0.27	0.0
9	Blue Eagle Ranch, Nev.	01/13/81	04/01/81	24	0.18	0.0
10	Complex I, Nev.	01/13/81	04/02/81	25	0.32	3.2 ¹
11	Complex I, Nev.	01/13/81	04/02/81	23	0.28	0.0
12	Desert Game Range, Nev.	01/07/81	03/31/81	12	0.15	0.0
13	Koyne's Ranch, Nev.	01/07/81	04/06/81	19	0.21	0.0
14	Hancock Summit, Nev.	01/14/81	04/06/81	18	0.22	0.0
15	Hancock Summit, Nev.	01/14/81	04/06/81	18	0.22	0.0
17	Nyala, Nev.	01/07/81	04/07/81	17	0.19	0.0
18	Nyala, Nev.	01/07/81	04/07/81	19	0.21	0.0
19	Goldfield, Nev.	01/06/81	03/31/81	18	0.21	0.0
21	Beatty, Nev.	01/07/81	04/07/82	23	0.25	0.0
22	Alamo, Nev.	01/14/81	04/06/81	17	0.20	0.0
23	Alamo, Nev.	01/16/81	04/09/81	17	0.20	0.0
24	Desert Game Range, Nev.	01/07/81	03/31/81	9.5	0.11	0.0
25	Desert Game Range, Nev.	01/07/81	03/31/81	15	0.18	0.0

¹ These net exposures are attributed to the small variance in the environmental background result, not a personnel exposure.

TABLE 6. LONG-TERM HYDROLOGICAL MONITORING PROGRAM RESULTS FOR
FIRST QUARTER 1981

Sampling Location		Collection Date	Tritium Conc. $\pm 2\sigma$ (pCi/l)	% of Conc. Guide
PROJECT DRIBBLE - MISSISSIPPI				
Baxterville	Baxterville City Well	03/23/81	570 $\pm$ 270	0.02
	Lower Little Creek	03/30/81	470 $\pm$ 250	0.02
	Well HT-2C	04/05/81	630 $\pm$ 260	0.02
	Well HT-4	04/04/81	470 $\pm$ 250	0.02
	Well HT-5	04/04/81	570 $\pm$ 250	0.02
	Well E-7	04/05/81	<500	<0.02
	Half Moon Creek	03/25/81	630 $\pm$ 260	0.02
	R. L. Anderson	03/30/81	<500	<0.02
	M. Lowe	03/21/81	<500	<0.02
	R. Ready	03/23/81	<500	<0.02
	W. Daniels, Jr.	03/23/81	490 $\pm$ 260	0.022
	Half Moon Creek Ovrflw	03/25/81	940 $\pm$ 270	0.03
	Well Ascot 2	03/31/81	660 $\pm$ 260	0.02
	Well HMH-1	03/25/81	12,000 $\pm$ 400	0.4
	Well HMH-2	03/25/81	680 $\pm$ 270	0.02
	Well HMH-3	03/25/81	<500	<0.02
	Well HMH-4	03/25/81	470 $\pm$ 260	0.02
	Well HMH-5	03/25/81	6,500 $\pm$ 350	0.2
	Well HMH-6	03/25/81	<500	0.02
	Well HMH-7	03/25/81	<500	0.02
	Well HMH-8	03/25/81	<500	0.02

TABLE 6. (Continued)

Sampling Location		Collection Date	Tritium Conc. $\pm 2\sigma$ (pCi/l)	% of Conc. Guide
PROJECT DRIBBLE - MISSISSIPPI				
Baxterville	Well HMH-9	03/25/81	<500	<0.02
	Well HMH-10	03/25/81	<500	<0.02
	Well HMH-11	03/25/81	<500	<0.02
	B. Chambliss	03/21/81	580 $\pm$ 250	0.02
	Well HM-S	03/24/81	28,000 $\pm$ 540	0.9
	Well HM-1	03/27/81	<400	<0.02
	Well HM-L	03/04/81	2,700 $\pm$ 300	0.09
	Well HM-2A	03/28/81	<500	<0.02
	Well HM-2B	03/28/81	<500	<0.02
	Well HM-3	03/30/81	<500	<0.02
	B. R. Anderson	03/23/81	<500	<0.02
	R. Mills	03/21/81	490 $\pm$ 250	0.02
	A. C. Mills	03/21/81	410 $\pm$ 250	0.01
	G. Kelly	03/21/81	680 $\pm$ 260	0.02
	H. Anderson	03/23/81	<500	<0.02
	REEC Co Pit Drainage-A	03/24/81	<500	<0.02
	REEC Co Pit Drainage-B	03/24/81	2,400 $\pm$ 290	0.08
	REEC Co Pit Drainage-C	03/24/81	<500	<0.02
	Well HM-L2	04/06/81	530 $\pm$ 250	0.02
	Pond W of GZ	03/25/81	630 $\pm$ 260	0.02
Columbia	City Well 64B	03/23/81	550 $\pm$ 270	0.02

TABLE 6. (Continued)

Sampling Location		Collection Date	Tritium Conc. $\pm 2\sigma$ (pCi/l)	% of Conc. Guide
Lumberton	City Well 2	03/23/81	<400	<0.02
Purvis	City Supply	03/23/81	680 $\pm$ 270	0.02
NTS SEMI-ANNUAL - NEVADA				
Ash Meadows	Crystal Pool	01/09/81	<400	<0.02
	Well 18S-51E-7DB	01/09/81	<400	<0.02
	Well 17S-50E-14CAC	01/09/81	<400	<0.02
	Fairbanks Springs	01/09/81	<400	<0.02
Beatty	NECO Well	01/20/81	<400	<0.02
	Well 11S-48-1DD	01/08/81	<400	<0.02
	City Supply 12S-47E-7DBD	01/20/81	<400	<0.02
Indian Sprgs	USAF Well 2	01/06/81	<400	<0.02
	Sewer Co. Inc., Well 1	01/06/81	390 $\pm$ 210	0.01
Lathrop Wells	City Well 15S-50E-18CDC	01/08/81	<400	<0.02
NTS	Well UE15D	01/06/81	<400	<0.02
	Test Well D	01/07/81	<400	<0.02
	Well UE1C	01/07/81	<400	<0.02
	Well C-1	01/21/81	<400	<0.02
	Well UE5C	01/22/81	<400	<0.02
	Well 5B	01/22/81	<400	<0.02
Oasis Valley	Goss Springs	01/08/81	<400	<0.02

(continued)

TABLE 6. (Continued)

Sampling Location		Collection Date	Tritium Conc. $\pm 2\sigma$ (pCi/l)	% of Conc. Guide
NTS MONTHLY - NEVADA				
NTS	Well 3	01/22/81	<400	<0.02
	Well 3	02/11/81	<400	<0.02
	Well 3	03/05/81	<400	<0.02
	Well 4	01/22/81	<400	<0.02
	Well 4	02/11/81	<400	<0.02
	Well 4	03/05/81	<400	<0.02
	Well 8	01/21/81	<400	<0.02
	Well 8	02/11/81	380 $\pm$ 230	0.01
	Well 8	03/05/81	560 $\pm$ 250	0.02
	Well U3CN-5	01/22/81	<400	<0.02
	Well U3CN-5	02/12/81	<400	<0.02
	Well U3CN-5	03/04/81	<400	<0.02
	Well A	01/21/81	380 $\pm$ 230	0.02
	Well C	01/21/81	<400	<0.02
	Well C	02/11/81	380 $\pm$ 230	0.02
	Well C	03/05/81	<400	<0.02
	Well 5C	01/22/81	<400	<0.02
	Well 5C	02/12/81	<400	<0.02
	Well 5C	03/04/81	<400	<0.02

(continued)

TABLE 6. (Continued)

Sampling Location	Collection Date	Tritium Conc. $\pm 2\sigma$ (pCi/l)	% of Conc. Guide
Army Well 1	01/22/81	<400	<0.02
Army Well 1	02/12/81	<400	<0.02
Army Well 1	03/04/81	<400	<0.02
Well 2	02/11/81	<400	<0.02
Well 2	03/05/81	<400	<0.02
Test Well B	01/21/81	480 $\pm$ 230	0.02
Test Well B	02/10/81	480 $\pm$ 230	0.02
Test Well B	03/03/81	460 $\pm$ 230	0.02
NTS Well J-1	01/22/81	<400	<0.02
Well J-13	02/12/81	<400	<0.02
Well J-13	03/04/81	<400	<0.02
Well U19C	01/21/81	<400	<0.02
Well U19C	02/11/81	<400	<0.02
Well U19C	03/05/81	<400	<0.02
Well UE7NS	01/22/81	1,700 $\pm$ 250	0.06
Well UE7NS	02/12/81	1,200 $\pm$ 240	0.04
Well UE7NS	03/04/81	2,300 $\pm$ 280	0.08